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ABSTRACT

Self-regulation refers to the process whereby students activate and sustain cognitions, behaviors, and affects, which are systematically oriented toward attainment of goals. Effective self-regulation requires that students have goals and the motivation to attain them, and make attributions (beliefs about the causes of outcomes) that enhance motivation. A social cognitive view is presented in which attributions influence self-regulation largely through their effects on self-efficacy, or personal beliefs about one's capabilities to learn or perform skills at designated levels. Attributions enter into self-regulation when students compare and evaluate their performances against their goals. Research substantiates the idea that self-regulation depends on students forming attributions that sustain learning efforts and promote self-efficacy. Research is reviewed on the self-regulatory role of attributional feedback that links students' outcomes with one or more attributions, and on correlational and causal relations among attributions, self-efficacy, and achievement outcomes. Suggestions for future research are provided. (Contains 35 references.) (Author)

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Motivating Self-Regulation of Learning: The Role of Performance Attributions

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Abstract

Self-regulation refers to the process whereby students activate and sustain cognitions, behaviors, and affects, which are systematically oriented toward attainment of goals. Effective self-regulation requires that students have goals and the motivation to attain them, and make attributions (beliefs about the causes of outcomes) that enhance motivation. A social cognitive view is presented in which attributions influence self-regulation largely through their effects on self-efficacy, or personal beliefs about one's capabilities to learn or perform skills at designated levels. Attributions enter into self-regulation when students compare and evaluate their performances against their goals. Research substantiates the idea that self-regulation depends on students forming attributions that sustain learning efforts and promote self-efficacy. Research is reviewed on the self-regulatory role of attributional feedback that links students' outcomes with one or more attributions, and on correlational and causal relations among attributions, self-efficacy, and achievement outcomes. Suggestions for future research are provided.

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Motivating Self-Regulation of Learning: The Role of Performance Attributions

Self-regulation refers to the process whereby students activate and sustain cognitions, behaviors, and affects, which are oriented toward the attainment of goals (Zimmerman, 1989, 1990). Self-regulation includes such activities as: attending to and concentrating on instruction; organizing, coding, and rehearsing information to be remembered; establishing a productive work environment; using resources effectively; holding positive beliefs about one's capabilities, the value of learning, the factors influencing learning, and the anticipated outcomes of actions; and experiencing pride and satisfaction with one's efforts (Schunk, 1989).

Effective self-regulation requires that students have goals and the motivation to attain them (Bandura, 1986; Zimmerman, 1989). Students must regulate not only their actions but also their underlying achievement-related cognitions, beliefs, intentions, and affects. In this paper I focus on the role of performance attributions in self-regulation. Attributions are beliefs about the causes of outcomes (Weiner, 1979). Research substantiates the idea that self-regulation depends on students forming attributions that sustain learning efforts and promote feelings of efficacy about performing well (Schunk, 1989; Zimmerman & Martinez-Pons, 1992).

Theoretical Background

My conceptual focus is social cognitive theory, which views self-regulation as comprising three processes: self-observation, self-judgment, self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986). Self-observation is deliberate attention to aspects of one's behavior (Bandura, 1986). Self-observation is necessary but by itself insufficient for sustained self-regulation. A second process is self-judgment, which refers to comparing present performance with one's goal. Such comparisons inform one of goal progress and can exert motivational effects on future performance. Self-reactions to goal progress may be evaluative or tangible (Bandura, 1986). Evaluative reactions involve beliefs about progress. The belief that one is making progress, along with the anticipated satisfaction of goal accomplishment, enhances self-efficacy and sustains motivation. People also may react in a tangible fashion to perceived progress; for example, by buying something they want or taking a night off from studying. The anticipated consequences of behavior rather than the consequences themselves boost motivation (Bandura, 1986).

At the start of learning activities students have such goals as acquiring skills and knowledge, finishing work, and making good grades. During the activities students observe, judge, and react to their perceptions of goal progress. These self-regulatory processes interact with one another. As students observe aspects of their behavior they judge them against standards and react positively or negatively. Their evaluations and reactions set the stage for additional observations of the same behaviors or others. These processes also interact with the environment (Zimmerman, 1989). Students who judge their learning progress as inadequate may react by asking for teacher assistance. In turn, teachers may teach students a more efficient strategy, which students then use to foster learning. That environmental factors can help develop self-regulation is important, because educators increasingly are

advocating teaching students self-regulatory strategies (Schunk, 1989; Zimmerman, 1990).

Effective self-regulation depends on students making attributions that enhance motivation. Weiner (1979; 1985) formulated an attributional theory of achievement behavior and postulated that students attribute their successes and failures to such factors as ability, effort, task difficulty, and luck (among others). These factors are given general weights and for any given outcome one or two factors will be perceived as primarily responsible. Thus, a student who receives an A on a science test might attribute it largely to ability ("I'm good in science") and effort ("I studied hard for the test").

Causes can be represented along three dimensions: internal or external to the individual, relatively stable or unstable over time, controllable or uncontrollable by the individual. Attributions affect students' expectations, motivation, and emotions (Weiner, 1979). Stability influences expectancy of success. Assuming that task conditions remain much the same, success ascribed to stable causes (e.g., high ability) results in higher expectations of success than attributions to unstable causes (good luck). Locus influences affective reactions. Learners experience greater pride (shame) after succeeding (failing) when outcomes are attributed to internal causes rather than to external ones. Controllability has diverse effects. Feelings of control increase one's choice of academic tasks, effort, persistence, and achievement (Bandura, 1986). The perception of little control over academic outcomes negatively affects expectations, motivation, and emotions (Licht & Kistner, 1986).

Attributions enter into self-regulation during the self-judgment and self-reaction stages when students compare and evaluate their performances (Schunk, 1989). Whether goal progress is deemed acceptable depends on its attribution. Students who attribute success to factors over which they have little control (e.g., luck, task ease) may hold low expectancies for success if they believe they cannot succeed on their own. If they believe they lack ability to perform well, they may judge learning progress as deficient and be unmotivated to work harder. Conversely, students who attribute success to ability, effort, and effective use of strategies, should experience higher self-efficacy and remain motivated to work productively.

In the social cognitive view, attributions influence self-regulation largely through their effects on perceptions of self-efficacy. Self-efficacy refers to personal beliefs about one's capabilities to learn or perform skills at designated levels (Bandura, 1986). Self-efficacy is hypothesized to influence choice of activities, effort expended, and persistence (Bandura, 1986). Compared with students who doubt their learning capabilities, those with high self-efficacy for accomplishing a task participate more readily, work harder, and persist longer when they encounter difficulties. Learners acquire information to appraise their self-efficacy from their performance accomplishments, vicarious (observational) experiences, forms of persuasion, and physiological reactions (Schunk, 1989).

Information acquired from these sources does not influence self-efficacy automatically but rather is cognitively appraised (Bandura, 1986). Learners weigh and combine the contributions of such factors as perceptions of their ability, task difficulty, amount of effort expended, amount and type of

assistance received from others, perceived similarity to models, and persuader credibility (Schunk, 1989).

Effective self-regulation depends on holding an optimal sense of self-efficacy for learning during task engagement (Bandura, 1986; Bouffard-Bouchard, Parent, & Larivee, 1991; Zimmerman, 1989). As students work on a task they compare their performances to their goals. Self-evaluations of progress enhance self-efficacy and keep students motivated to improve.

Research Evidence

Much of the research investigating the self-regulating role of attributions comes from studies in which investigators attempt to modify learners' attributions by providing feedback linking their successes or failures with one or more attributions. Although there is evidence that attributional feedback changes students' attributions (Andrews & Debus, 1978; Carr & Borkowski, 1989; Dweck, 1975), many studies have not assessed self-efficacy. There also are studies in which attributions were not assessed but which show that attributional feedback influences students' self-efficacy (Schunk, 1982; Schunk & Gunn, 1985).

A series of studies by Schunk and his colleagues demonstrates that attributional feedback affects students' attributions and self-efficacy during mathematics and reading instruction (Schunk, 1983, 1984; Schunk & Cox, 1986; Schunk & Rice, 1986). As an illustration of the attributional and self-efficacy assessments, Schunk and Cox measured attributions by presenting students with four, 10-unit scales, ranging from not at all to a whole lot. The scales were labeled good at it (ability), worked hard (effort), easy problems (task), and lucky (luck). Students were asked to think about their work in mathematics and for each scale circle the number that corresponded to how important they felt that factor was for success. For the self-efficacy assessment, students completed 10-unit scales ranging from not sure to really sure. Children were briefly shown (but did not solve) sample problems and for each judged their certainty of correctly solving problems of that type.

Schunk (1983) provided children deficient in subtraction skills with instruction and self-directed problem solving over sessions. During the problem solving ability-feedback children periodically received verbal feedback linking their successful problem solving with ability (e.g., "You're good at this"), effort-feedback subjects received effort statements ("You've been working hard"), ability-plus-effort students received both forms of feedback, and no-feedback students did not receive attributional feedback. In addition to self-efficacy and skill, Schunk also had children assess the amount of effort they expended during the sessions, which, although not a pure attributional measure, reflects the extent that children believed their successes were due to effort.

Ability feedback promoted self-efficacy and skill more than did the other three conditions; the effort and ability-plus-effort conditions outperformed the no-feedback group. The three treatment conditions solved more problems during self-directed practice (a measure of motivation) than did the no-feedback condition. The effort and ability-plus-effort conditions judged effort expenditure greater than the ability group, who judged effort higher than the no-feedback condition. These findings support the point that the

same degree of success attained with less effort strengthens self-efficacy more than when greater effort is required (Bandura, 1986). Ability-plus-effort subjects may have discounted ability information in favor of effort; they may have wondered how good they were if they had to work hard to succeed.

Schunk (1984) determined how the sequence of attributional feedback influences achievement outcomes. Children with low subtraction skills received instruction and self-directed practice over sessions. One group (ability-ability) periodically received ability feedback for success, a second group (effort-effort) received effort feedback, in a third condition (ability-effort) ability feedback was given during the first half of the instructional program and effort feedback during the second half, and for a fourth condition (effort-ability) this sequence was reversed. Self-efficacy, skill, and attributions for problem-solving progress during the instructional sessions were assessed following the last session.

Students who initially received ability feedback (ability-ability and ability-effort conditions) demonstrated higher self-efficacy and skill and placed greater emphasis on ability as a cause of success than those initially receiving effort feedback (effort-ability and effort-effort conditions). Early successes constitute a prominent cue for forming ability attributions. Telling students that ability is responsible for their successes supports these perceptions and enhances self-efficacy. Effort-ability students may have discounted ability feedback and wondered how competent they were because their prior successes were attributed to effort.

Schunk and Cox (1986) provided subtraction instruction with self-directed practice to children with learning disabilities, along with effort feedback during the first half of the instructional program, effort feedback during the second half, or no effort feedback. Effort feedback enhanced self-efficacy, skill, self-directed problem solving (motivation), and effort attributions for success more than no effort feedback. Students who received effort feedback during the first half of the instructional program judged effort as a more important cause of success than subjects who received feedback during the second half.

Telling students that effort was responsible for their successes likely was credible to these students, who had encountered prior difficulties learning mathematical skills. Effort feedback conveys that students can continue to improve by working hard, which raises self-efficacy and motivation. That the two effort feedback conditions did not differ in achievement outcomes suggests that students' learning disabilities may have forced them to work hard throughout the instructional program, so despite their early successes later effort feedback also seemed credible.

Schunk and Rice (1986) gave children with reading deficiencies instruction and practice in identifying important ideas. Ability-ability students periodically received ability feedback for their successful comprehension, effort-effort children received effort feedback, ability-effort students were given ability feedback during the first half of the instructional program and effort feedback during the second half, and for students in the effort-ability condition this sequence was reversed. Practice time was not self-directed but rather under the direction of a teacher; however, self-regulatory processes were involved because children were taught

a comprehension strategy and largely on their own during the instructional sessions to apply it.

The four conditions did not differ in comprehension skill but the ability-ability and effort-ability conditions raised self-efficacy more than did the other two conditions. Children who received ability feedback during the second half of the program placed greater emphasis on ability as a cause of success than children who received effort feedback during the second half. Ability-effort students made higher effort attributions than ability-ability children.

It is difficult to reconcile these findings showing benefits of later ability feedback with those of Schunk (1984) who found that early ability feedback was better. These studies differed in type of subjects, content, and number and format of instructional sessions. Schunk and Rice's subjects were children who had severe reading problems and experienced much school failure. It is possible that early ability feedback had less impact because they discounted it due to their history of failure but that after continued successes over sessions they were more likely to adopt the ability information.

Relich, Debus, and Walker (1986) explored attributional feedback effects during instruction on long division. Children identified as learned helpless based on their attributions of failure to low ability and their devaluation of the role of effort were exposed to modeled demonstrations of division operations or reviewed an instructional booklet. Half of the subjects in each of these treatments received attributional feedback stressing effort and ability for success and failure. All students participated in self-directed practice over sessions. The attributional feedback raised self-efficacy and skill and these students displayed less learned helplessness following training compared with the control and no-feedback conditions (i.e., less attribution of failure to low ability and greater emphasis on effort as a cause of success and failure).

In some studies researchers did not provide attributional feedback but did investigate the operation of self-efficacy and attributions during self-regulation. Butkowsky and Willows (1980) assessed good, average, and poor readers' initial expectancies for success (analogous to self-efficacy) for solving anagrams, after which subjects attempted to solve anagrams and were given a line-drawing task (success and failure were manipulated). Following the tests, children made attributions for their performances and again judged expectancies for success. Good and average readers held higher initial expectancies for success and persisted longer on the tasks than poor readers; good readers judged expectancies higher than average readers. Poor readers were more likely to attribute failure to internal and stable causes (e.g., low ability) and less likely to attribute success to ability. Relative to good and average readers, poor readers showed a greater decrement in expectancy of success following failure.

Salomon (1984) had children assess attributions for success and failure in learning from printed materials and from television and judge self-efficacy for learning different content from print and from TV. They then either watched a silent film or read the comparable narrative text, judged the amount of mental effort they expended in attempting to learn the content, and took an achievement test. Children judged self-efficacy for learning from TV higher

than learning from print. They attributed success in learning from print more to internal factors (ability, effort) and success in learning from TV to external causes. For failure, they gave external attributions (task difficulty) for print and internal attributions for TV. Compared with TV subjects, print children scored higher on the achievement test and judged mental effort higher. Although this study shows that a high sense of self-efficacy does not necessarily facilitate self-regulatory efforts and achievement, it is imperative that students feel they are capable of learning. Motivation suffers when self-efficacy is too low. An adequate level is needed to sustain motivation and self-regulation.

Research has examined the relation of self-efficacy and attributions to each other and to achievement outcomes. Significant and positive correlations have been obtained between perceived self-efficacy and skillful performance (Relich et al., 1986; Schunk, 1983, 1984; Schunk & Cox, 1986; Schunk & Gunn, 1986; Schunk & Rice, 1986). Salomon (1984) found that self-efficacy correlated positively with skill among subjects who studied print but negatively among those who watched TV.

Ability attributions and self-efficacy typically bear a positive relation to one another (Schunk, 1984; Schunk & Cox, 1986; Schunk & Gunn, 1986; Schunk & Rice, 1986). Schunk and Cox (1986) found a positive relation between effort attributions for success and self-efficacy. Relich et al. (1986) found that their learned helplessness index (which emphasized effort as a cause of outcomes and de-emphasized ability as a cause of failure) correlated positively with self-efficacy and achievement. In Salomon's (1984) study, subjects' judgments of mental effort during learning correlated positively with self-efficacy among print subjects and negatively among TV subjects. Several studies have shown that achievement correlates positively with attributions to ability (Schunk, 1984; Schunk & Cox, 1986; Schunk & Gunn, 1986) and effort (Schunk & Cox, 1986; Schunk & Gunn, 1986). Schunk and Cox (1986) obtained a positive correlation between ability and effort attributions for success.

Schunk and Gunn (1986) determined the percentage of variance in achievement outcomes accounted for by various predictors. Children received instruction in long division and engaged in self-directed practice. Children verbalized aloud during the problem solving; verbalizations were categorized as reflecting effective or ineffective task strategies depending on whether their use would lead to correct solutions. Self-efficacy, skill, and attributions for successful problem solving were assessed. Ability and luck attributions accounted for significant increments in the explained variability of self-efficacy (the luck effect was in a negative direction). For division skill, self-efficacy and use of effective task strategies accounted for significant increments in variability.

Research also has tested causal models. Relich et al. (1986) found that attributional feedback had a significant direct effect on attributions, self-efficacy, and achievement; attributions influenced self-efficacy; and self-efficacy had a direct effect on achievement. The effect of attributions on achievement was weak, which suggests that attributions affect achievement indirectly through self-efficacy. Schunk and Gunn (1986) found that the largest direct influence on changes in division skill was due to use of effective strategies; skill also was influenced by self-efficacy and effort

attributions. The strongest influence on self-efficacy was ability attributions for success.

Future Research

Research supports the point that attributions are important self-regulatory processes that affect achievement outcomes. At the same time, there is much more we need to know about the self-regulation of attributions in academic contexts. Most research studies have not explored how students self-regulate attributions but rather have examined the causes and consequences of these processes. We need replication of studies with different student populations and academic content. Some areas especially deserving of research attention are summarized below.

Operation of Self-Regulatory Processes

Self-regulated learners are active behaviorally, cognitively, and affectively (Zimmerman, 1989). They organize and transform information, rehearse information to be remembered, and use memory aids. Investigating how self-efficacy and attributions interact with these strategies and other self-regulatory processes during academic engagement would provide valuable insights and have implications for teaching.

For example, effective self-regulation depends on students having goals and evaluating their goal progress during task engagement. Performance self-judgments are affected by goal properties: proximity, specificity, difficulty level. Goal effects also may depend on whether the goal denotes a learning or performance outcome (Ames, 1992; Meece, 1991). A learning goal refers to what knowledge and skills students are to acquire; a performance goal denotes what task students are to complete. Goal setting research typically has focused on such goals as rate or quantity of performance, but educators increasingly are advocating that greater emphasis be placed on learning processes (e.g., strategies) (Borkowski, Carr, Rellinger, & Pressley, 1990).

Learning and performance goals may exert different effects on self-regulatory activities even when the goals are similar in goal properties (Schunk & Swartz, 1993a, 1993b). A learning goal focuses students' attention on processes and strategies that help them acquire knowledge and skills. Students who adopt a learning goal are apt to experience a sense of self-efficacy for skill improvement and engage in activities they believe enhance learning (e.g., expend effort, persist, use effective strategies). As they work and perceive improvement they may attribute it to such factors as effort, ability, and strategy use. Perceived learning progress also raises self-efficacy and enhances self-regulation over time.

In contrast, a performance goal focuses students' attention on completing the task. Such a goal may not highlight the importance of the processes and strategies underlying task completion or result in a sense of self-efficacy for learning. During task engagement, students may compare their work with that of their peers instead of with their prior performances. For students who experience difficulties these social comparisons result in low perceptions of ability (Ames, 1992). Although performance goals may motivate students over short periods or on easier tasks, an overall lower sense of self-efficacy and possibly dysfunctional attributions will not sustain self-regulation.

Research testing these ideas has yielded mixed evidence (Elliott & Dweck, 1988; Meece, Blumenfeld, & Hoyle, 1988). Research has not investigated how goal orientations, attributions, and self-efficacy, interact during learning and change as students acquire skills. Such research might be aided with think-aloud protocols, where students verbalize aloud as they work on a task and their verbalizations are classified according to the type of self-regulatory process they reflect.

Developmental Changes

Developmental factors should influence how learners regulate attributions during learning (Paris & Newman, 1990). Children perceive effort as the prime cause of outcomes but around the age of nine a distinct conception of ability begins to emerge (Nicholls, 1978). Ability attributions become increasingly important with development, whereas effort attributions decline in importance.

There also are developmental changes in children's conceptions of ability. Children below about the age of 6 years typically hold an incremental view: Ability is roughly synonymous with learning and children believe that greater effort leads to higher ability (Nicholls, 1983). Ability is judged relative to previous performance and feelings of efficacy result when performance is improved. With development children may develop an entity perspective: Ability as an independent entity with an upper limit and effort increases skill only up to that limit. Students determine their ability levels by comparing their performances to those of others. Improving one's performance will not raise efficacy unless students believe that others cannot perform as well with the same effort.

This research suggests that effective self-regulation requires changes in attributional beliefs with development. We can ask which views of ability and effort best sustain self-regulation over time among adults who presumably could hold either view. Research might investigate how different tasks affect conceptions of ability. Speed tasks might engender an entity view; tasks that require effort for success (e.g., long-term projects) may foster an incremental perspective. Finally, there is a need for cross-cultural research exploring developmental changes in conceptions of ability because most research has been conducted in Western cultures.

Longitudinal Studies

More longitudinal research would be valuable because self-efficacy and attributions might undergo changes over time. Many academic activities are long term in nature: building a science fair project, writing a lengthy term paper or article, conducting an experiment over several days. In the early stages of learning students may not feel skillful but stay on-task as long as they believe they can learn. Effort attributions are highly credible (Schunk, 1989). As skills develop, learners should be able to work on tasks with less effort and ability attributions may become more credible.

Think-aloud protocols are useful for exploring the operation of self-regulatory processes. Schunk and Gunn (1986) found that children verbalize task strategies and achievement beliefs while working on cognitive tasks. Use of think-aloud probes at various times during a longitudinal study could show how changes in self-efficacy and attributions relate to task performance.

Classroom-Based Research

Self-regulation research examining the effects of attributions on self-efficacy in learning settings is needed. Many studies examining acquisition of attributions and self-efficacy have been conducted outside of classrooms. A typical procedure is that students make judgments about hypothetical situations (Graham, 1991). These studies are informative but do not address how the complexities of classrooms affect self-regulation.

Research is also needed on the effectiveness of classroom methods to train students to effectively regulate attributions during cognitive skill learning. Research using teachers, textbooks, and computers is desirable. Researchers should work directly with teachers to evaluate the effectiveness of methods. Teachers may need to be trained to administer treatments that are designed to influence self-regulation. Once trained, teachers can become active research collaborators.

Conducting research in classrooms will require broadening our attributional focus. Attributional research has focused on ability and effort attributions. Although there are theoretical and practical reasons for this, it does not reflect the emphasis of self-regulation on effective use of strategies (Zimmerman, 1989, 1990). Schunk and Gunn (1986) found that 94% of students' verbalizations represented application of strategic steps oriented toward problem solving. We need research examining the interface of strategy attributions and self-efficacy during skill learning. Given that teachers teach strategies and that strategy use is controllable by students, strategy attributions are apt to facilitate self-efficacy, motivation and learning (Borkowski, Weyhing, & Carr, 1988; Zimmerman & Martinez-Pons, 1992).

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